

Contingency evaluation for voltage security assessment of power systems

ABSTRACT

The demand for electricity is expected to continue to increase given the recent world population projection of about 30% increase in the next three decades. Consequently power systems are equally expected to be more heavily loaded than before. Unfortunately the environmental and economic constraints restrict the expansion of the existing power system facilities. This scenario requires a constant attention since it could result to voltage collapse which could in turn lead to a total blackout. This paper presents the procedure required to carry out a contingency assessment and ranking of the load buses and lines of power systems for voltage security. This would ensure that power systems are operated above a desired voltage stability margin to forestall voltage collapse. The impact of single line outage contingency on the static voltage stability margin, as well as the available transfer capability across the areas of the test system, are examined in the paper.

Keyword: Contingency evaluation; Critical line ranking; Line outage; Voltage collapse proximity indicator; Voltage security